ORIGINS 39

The Journal of The Biblical Creation Society £3.00

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EDITORIAL: HOW TO BUILD A HUMAN

"TO WHAT EXTENT does DNA shape our future?" asked the commentator introducing Part 2 of the BBC series: "How to build a human" (broadcast January 2002). Each cell in our body has 46 chromosomes that carries digital information embedded in a molecular structure known as DNA. A scientist assured us with enthusiasm that the DNA "contains all the genes needed to make a human." We were informed that "everything about us is determined by DNA".

What are Christians to make of this? Many will know that there has been a nature/nurture debate running for decades. That is, are we what we are because of inheritance (nature) or are we the products of our environment (nurture)? Have we now reached an answer? Is it correct to say that the "nature" argument has been vindicated by genetics? Furthermore, if our behaviour is controlled by genetics (and consequently by complex molecules within us), where does that leave Christian teaching on human responsibility for our thoughts and actions?

It took the programme quite a while to get to the link between genes and behaviour. Leading up to it were examples of genetic deformities. For example, a case of deformed fingers was linked to a single letter change in the coding of Chromosome 9. The commentator declared: "Now that we understand the magical process of growth, we are able to manipulate it." This conclusion is unwarranted. It is much more realistic to say "we understand a tiny bit more about growth and we have hopes that one day it will be possible to intervene in a controlled way".

Eventually, we reached the point in the programme where genes and behaviour were linked. There was the "ace" gene, which was suggested to affect endurance and strength (athletic behaviour). There was the "thrill seeking" gene, thought to be possessed by adventurers. There was also a gene for aggressive, impulsive behaviour. Unfortunately, the science in these presentations was a bit thin – researchers were saying positive things about their findings, but viewers were none the wiser about the data and the robustness of the conclusions.

A characteristic of the programme is that no dissent on genetic determinism ("DNA is everything") was aired. There was a brief acknowledgement that the search for personality genes is a contentious area of science, but the presentation was very one-sided. Viewers should be told that there is a vigorous debate over many of these issues. Here are four specific assertions that are actually highly contentious.

1. Claim: that everything about us is determined by DNA. The simple response to this is that it has never been demonstrated. It is a logical deduction, based on a particular model of cell biology. The claim needs to be tested, and unfortunately people are not doing this in their scientific work.

2. Claim: each gene affects one trait. At no time was there an acknowledgement that an individual gene can affect many traits, and that manipulating one gene (where the outcome is predictable) may result in additional outcomes (which are not predicted and which may not be desirable).

3. Claim: Knowing one's genetic makeup allows prediction of future behaviour. So strong do some people hold this view that it is entering legal argument. A lawyer representing a murderer in Death Row in the US was searching for ways of entering a plea of diminished responsibility. Effectively, the lawyer was saying "This man was destined to kill because of his genes". The genetic model adopted presumes that everything (physical traits and behaviour) is determined by DNA, but it must be pointed out that this model is not validated.

4. Claim: We understand what genes are doing, so we can manipulate processes of growth and development. The programme invited us to "imagine a world where you could know your child's destiny". Parents could influence their offspring by selecting their genetic makeup at conception. The fact is that we have only the slightest inkling of what our genes are actually doing, and we know so little about the link between genes and development that the claim amounts to nothing more than wishful thinking.

Can Christians inject any positive contributions to these issues? It might look obvious that we can contribute to discussions of ethical issues. However, Christians may be agreed on the principles (of acting always in love for God and our neighbour, and seeking to act as God's stewards in this world), but differ totally on the application! Some seek natural, ecological strategies, whereas others say that biotechnology is a wonderful way of fulfilling God's mandate to sustain, restore and improve Creation.

The other contribution that Christians can bring is a challenge to the genetic model that lies at the root of much biotechnology. Those of us who are scientists can address the scientific issues noted above. But all Christians can challenge the model by pointing out that humans are more than genes controlling bodies. Humans are spiritual beings with bodies.

We do not deny that genes influence behaviour – we have recognised for years that people have temperaments (sanguine, choleric, melancholic, phlegmatic) that are physiological in nature. Nevertheless, whilst our temperaments affect the way we experience temptation and the way we handle situations, they do not determine our behaviour. That can only be understood by relating behaviour to our relationship with God – and that is the reason why the genetic model is seriously deficient.

Unless our science of humanity incorporates knowledge about man's relationship with God, it will be seriously wide of the mark. This is a good example of the challenges facing Christians seeking to engage with contemporary culture. We must not live and think as though God is irrelevant to our intellectual lives. We cannot help the community of scientists and scholars if we do not challenge the "tacit atheism" of our age.

DAVID J. TYLER

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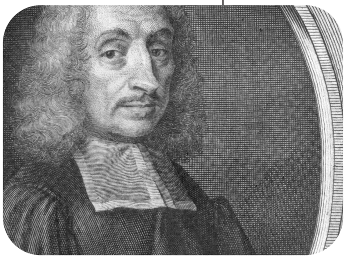

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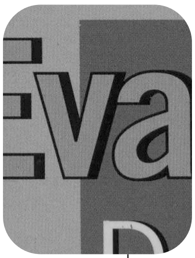

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› JOHN RAY.

FOUNDING FATHER OF BOTANY AND BRITISH NATURAL HISTORY

PIONEER OF INTELLIGENT DESIGN CONCEPTS

SHEENA TYLER

ONE OF THE MOST HEROIC MEN of science, whose Christian life and conduct is of great relevance today, is that of the naturalist John Ray. The contemporaries Isaac Newton, Robert Boyle and John Ray laid foundations of modern science in their respective disciplines of physics, chemistry and biology, in which their Christian worldview was of central importance to their pioneering efforts. Each of their lives represents different strategies of scholarship, ranging from bases at the renowned institutions of Oxford and Cambridge, to working independently in a rural hamlet. John Ray straddled both these strategies in his lifetime. We will look at his monumental achievements, his response to trials of faith under persecution and God's provision in the consequences, and we will see how his writings brought clarity, wit and powerfully reasoned evidence for the Creator.

> "THERE IS NO OCCUPATION MORE WORTHY AND DELIGHTFUL THAN TO CONTEMPLATE THE BEAUTEOUS WORKS OF NATURE AND HONOUR THE INFINITE WISDOM AND GOODNESS OF GOD"
>
> JOHN RAY

Biographical background

Within the home of the village blacksmith at Black Notley in Essex, John Ray was born in 1627. In the days when transport was by horse and agricultural tools were locally forged, his blacksmith father was a man of importance. Observing how machinery was constructed was probably foundational for Ray's emphasis on anatomical dissection and distinctions based on structural characteristics.

Ray's mother, a Christian from her youth, contributed greatly to her community with her skills of herbalism. The huge knowledge such as hers of the use and virtues of plants were of importance in medical treatment, and is likely to have generated Ray's botanical interest: in his book, *Catalogus plantarum Angliae*, he gives a huge list of diseases and the herbal prescriptions appropriate for their treatment. His boyhood was spent in daily familiarity with the richest of wild countryside, giving him the lifelong instinct for the study of live nature, the mark of the naturalist.

The Rectors at Black Notley and the Vicar at Braintree, highly educated and "godly preaching men", probably had a large influence upon Ray's education, the training of his genius, and his Christian outlook (Raven, 1942, pp.14–17. Raven remains the best autobiographical source on the life of Ray, and is drawn from throughout this article).

At the age of 16 he entered Cambridge University, benefiting from a scholarship of £3 per annum for hopeful poor scholars. His tutor Isaac Barrow, who later became the first Lucasian professor of mathematics, declared him to be one of the two most brilliant pupils of his whole career. Ray was elected as a Fellow at Trinity College in 1649, and appointed lecturer in Greek, Mathematics and Humanities onwards from 1651.

It was now in the aftermath of the Civil War, which heralded not only a political revolution leading to the birth of democracy, but a scientific revolution in which empirical observation and experiment were beginning to sweep away the unchallenged dogmas of the ancient Greeks that completely dominated university teaching. Mathematics, science and philosophy were wholly lacking when Ray had entered Cambridge: grammar, logic and rhetoric were the only subjects of study. But there was a revolt from the new generation of scholars against this, notably by the Christian poet John Milton, who urged a turning to the beauty and order of nature. The earlier protests of Bacon and the fashionable logic of Descartes had all left their mark, but these new studies were all made outside the official university curriculum. Both Ray and Isaac Newton, who was soon to follow him at Trinity, were predominantly self-taught in their early scientific careers. There was not yet a single laboratory of any kind at the University (Newton went on to build his own equipment and kiln) and Ray searched in vain throughout the University for a mentor to help him in his study of his first love, plants.

Ray seems to have progressed in science partly from the combined enthusiasms of a circle of fellow scholars, notably John Nidd, who would meet for comparative anatomy dissections of birds, fish and mammals. Ray was familiar with the then-known botanical catalogue manuscripts, and with painstaking fieldwork began to develop his own more accurate understanding of the nature and variety of the flora at large. He was further encouraged by the arrival in 1659 of a new master at Trinity, John Wilkins, who invited Ray to compile information on birds, reptiles, fish and plants in a contribution to a Wilkins' publication.

Ray – the father of botany

With no true botanical mentor (except at a future date, a group of botanists at Montpelier, notably the Bauhins), Ray nonetheless seems simply to have set off into field studies because the task of making order out of botanical chaos needed to be done.

Firstly, in the field he systematically documented the flora of Cambridgeshire, cataloguing it in the Cambridge Catalogue, (1660), which set new botanical standards. He eradicated the wrong descriptions, errors, false claims and duplications of species (the same species recorded twice, under a different name) of previous "Herbal" catalogues. Then he began his enormous expeditions throughout Britain, cataloguing plants exhaustively for his *Catalogus plantarum Angliae* (1670). Ray had superb powers of exact and discriminating observation, precise definitions and descriptions of nature, which had enormous influence on botany and zoology. It was as a result that he was the first to discover the monocotyledon-dicotyledonous seed leaf distinction, a major taxonomic criterion to this day.

Ray was thus established at Cambridge as a pioneering botanist of high renown. But suddenly his position came under threat.

Turmoil – and apparent disaster for Ray

The Regulations of the University made it obligatory for Fellows eventually to take Holy Orders, under solemn oath. Ray was reluctant, probably because the teaching of Christ encouraged a simple affirmation of resolve. He postponed the event for as long as possible, and the University authorities were most sympathetic, desiring to keep him, until the Rules dictated an ultimatum. Ray must follow these obligations or lose his position. Touched by the kindness of the College towards him, he accepted ordination in 1660, and so was allowed to continue in his academic post.

However, at the Restoration of the monarchy in 1662, Charles II insisted that all clergymen, including those such as Ray in University office, must take the oath required by the Act of Uniformity. This Act, compelling conformity to the religious practice and high ceremony of the Anglican state church, had just led to the expulsion of over 2000 Puritan ministers from their positions. Ray felt completely disgusted and unable to conform to the Act of Uniformity: had he not taken Holy Orders so soon previously, he would have been under no obligation to do so. Rather than compromise his faith, at the age of 35 after 18 years at the University, he was thus forced to leave his Fellowship at Cambridge.

Ray was now a cleric with no congregation, cast upon his faith in God for his resources. One of his former students, Frances Willughby, had worked with him on field excursions and together they were inspired to develop the Catalogues. In 1672 Willughby met with his death, and in his will left a

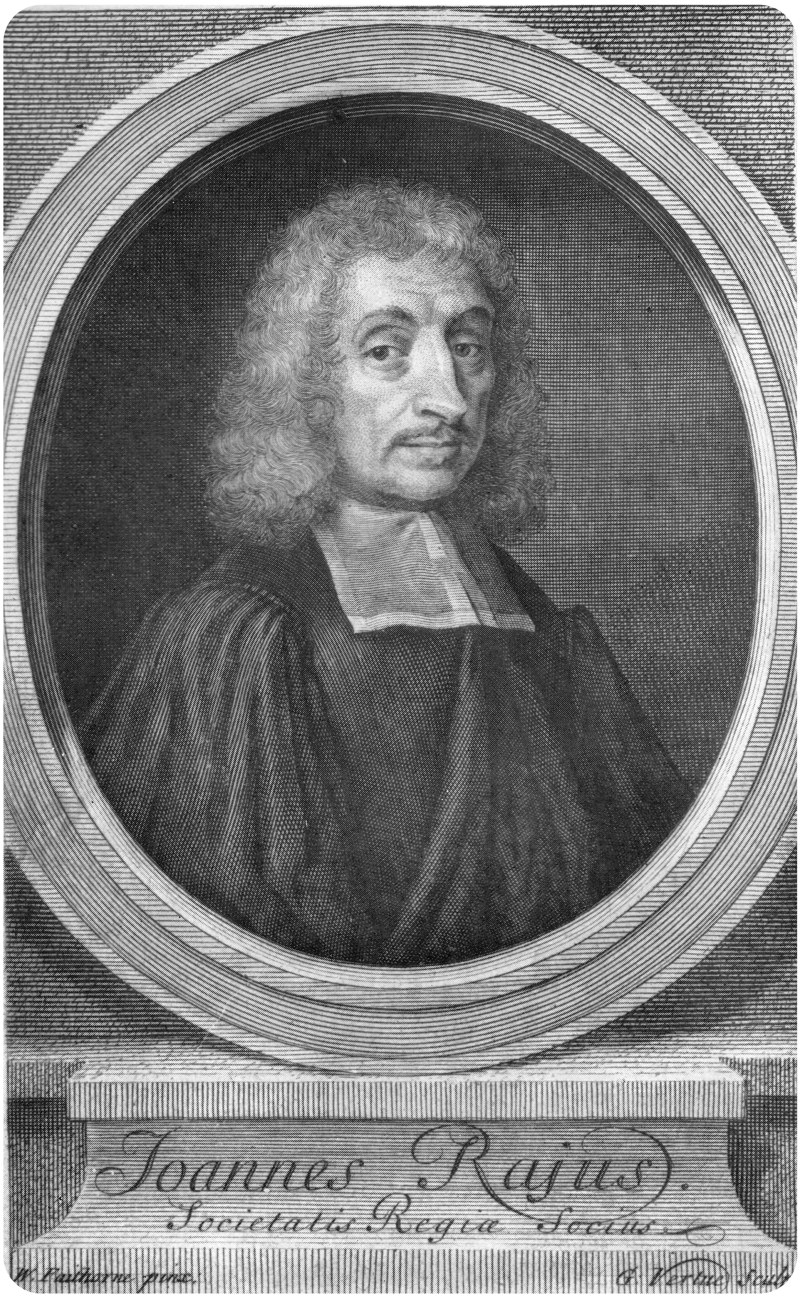
Joannes Rajus.
Societatis Regiæ Socius.
W. Faithorne pinx.
G. Vertue Sculp.

FIGURE 1: *John Ray*

modest but sufficient annual annuity which was to provide for Ray. Ray eventually settled and built a house back at Black Notley, with his wife, children and caring for his aged mother. Free from the responsibilities of University tuition, he was now simply Ray the naturalist, able to devote himself to his vocation. His children and neighbours helped him collect over 300 butterfly and other insect species, kept live in cages with their necessary foodstuffs as he observed their lifecycles and habits. What a home it must have been!

Prolific endeavours

In the following years Ray proceeded to write thousands of epoch-making pages for publication, with his greatest productivity from the age of 61 to 71.

In 1669 his paper on the "Motion of Sap in Trees" published in the Royal Society Transactions, was the first systematic attempt to study the physiology of the living plant, giving a new direction to botany (Raven, 1942, p.188).

He then turned, in his *Methodus Plantarum* (1682) to what does and what does not define a species, with what does not including size and colour, scent and taste, variegation, angles of stalk, flower doubleness, and size and taste of fruit.

His botanical *magnum opus* was his *Historium Plantarum* (1686), which was not only a 3000 page classification of the flora of Britain and Europe, but authoritatively surveyed the then-known field of botanical knowledge, with essays on plant physiology and structure. This included an affirmation of Jung's definition of a plant, into which Ray was able to incorporate "lacking sensation" by rejecting the then popular doctrine of sensitivity resulting from the anomaly of the sensitive plant, *Mimosa pudica*. Ray achieved this by the explanation of all movement by mechanical means (Webster, 1975).

Laying foundations in zoology, with his *Ornithologiae* (1676) he made the pioneering classification of birds according to anatomy and habitat, followed by *Historia piscium* (1686) for fish. Then he turned to invertebrates, which had been little surveyed before. Majoring on insects, his posthumous *Historia insectorum* was published in 1710.

He wrote more generally too, with accounts of English words and dialects, mining and industry, and palaeontology. His science and theology culminated beautifully in "Physico-Theological Discourses"; and "The Wisdom of God", written in English, was to be the most widely read and celebrated biology publication for the next 50 years.

In his final 10 years he suffered from painful sores which needed daily dressing. He and his family were often seriously ill. The sores eventually turned gangrenous and he died at home in 1705. Subsequent scholars' eulogies include that of Sir James Smith, describing him as "the most accurate in observation, the most philosophical in contemplation and the most faithful of description of all the botanists of his own or perhaps any other time" (Smith, 1819); Professor Boulger considered him "the greatest naturalist with one possible exception that England has ever produced" (cited in Raven, 1942, p.67); Sir Albert Seward added that "Ray set truth above tradition, and had the courage of his convictions. we do homage to him as one of the founders of modern science" (Seward, 1937); and at a present day symposium he was acknowledged as a major figure in taxonomy, inspiring Linnaeus and recognised as the father of British natural history (Ford, 1999).

Ray and Paley

Ray exhorted that "there is no occupation more worthy and delightful than to contemplate the beauteous works of nature and honour the infinite wisdom and goodness of God". His "Wisdom of God" (Ray, 1691) is a masterpiece resulting from such thoughts, and the antecedent of Paley's Natural Theology, surpassing it in prose and argument. Indeed, Paley plagiarised the "Wisdom of God" considerably, Raven commenting that "almost its whole contents are found rewritten but easily recognisable in his pages (Raven, 1942, p.452). Raven considered too Ray's analysis of greater merit, because Ray was "not content with the crude teleology" that Paley was later to express (Raven, 1942, p.457). It is significant that Darwin and subsequent Darwinian protagonists avoid engaging with Ray, but only with the more easily dismissed Paley, using an appeal to authority, in this case turned on its head. Thus they refer to the mere Reverend Paley as representing the Church view (Dawkins, 1987).

A pioneering scientist of such established reputation as Ray, is not so easily rejected on such grounds. Indeed, to this day there is a failure of Darwinists to really seriously, rather than superficially, interact with Ray's kind of reasoning. Science has yet to come to terms with design, especially exquisite design (Dembski, 2002).

Ray and Paley focussed on how the magnificence of this world was evidence of God's design. However, they both failed to sufficiently deal with disteleology – inferior design that is evil or incompetent (Dembski, 2002). David Hume (1779) consequently attacked them by claiming that evil is evidence for a God who did not create the world. Their happy view of nature thus supplied a ready source of material for its opponents (Hunter, 2003), to this very day. Unfortunately Ray ascribed inept design to the "subordinate ministry of an inferior Plastic Nature (Ray, 1691, pp. 51–2). However, the Bible clearly attributes it to the Fall, leading to a Creation in bondage, futility and decay (Romans 8). God creates beauty, but also the thorn and thistle (Genesis 3:18). Nonetheless, Ray's "Wisdom of God" was a rebuttal to the atheism of his day; thus he focussed on Epicurianism and spontaneous generation, the issues then in debate.

Ray's Design Arguments

Ray's writings are magnificent prose, both in Latin, at which he was a renowned authority, and English. His observational skills and literary command were a powerful combination. Thus he goes a step further than most, using his literary ability to become integral to his argument. His reader consequently reflects more thoughtfully on the likelihood of Divine Design. For example, contrast the matter-of-fact but stark contemporary descriptions of bird nesting behaviour with this account by Ray: “After they have laid their eggs, how silently and patiently do they sit upon them ’till they be hatch’d. Nay, with such an ardent and impetuous desire of sitting are they inspir’d. And yet one would think that sitting were none of the most pleasant Works” (Ray, 1691, p.120).

RAY DISCOVERED THAT FLOWERING PLANTS ARE OF TWO TYPES: THE MONOCOTYLEDONS BEAR ONE SEED LEAF (FIG 2A) AND THE DICOTYLEDONS BEAR TWO SEED LEAVES (FIG 2B), A CHIEF DISTINCTION TO THIS DAY.

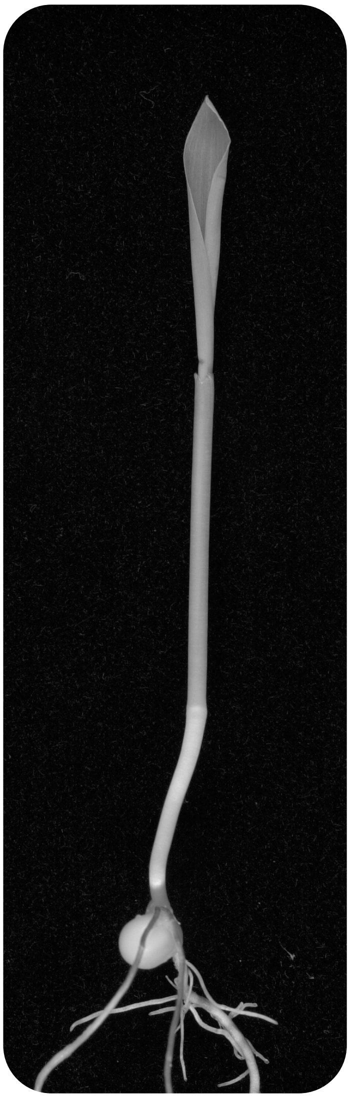

FIGURE 2A: *Sprouting maize seed*

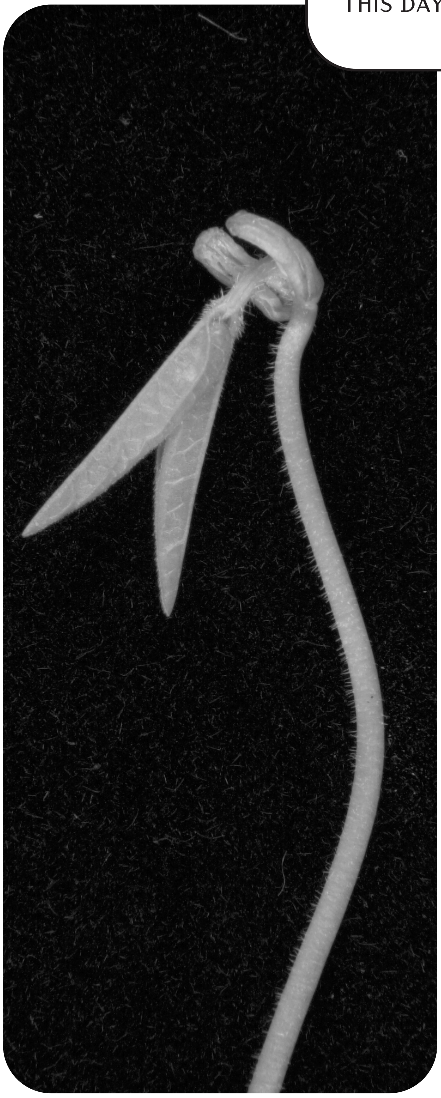

FIGURE 2B: *Sprouting mung bean seed*

Ray’s “Species”

The classification system of the day was in such chaos that Ray’s emphasis, as we have seen, was to bring greater accuracy and order, eradicating duplications, errors and trivial distinctions. One has to search hard in his writings for his reference to species in relation to creation. In papers discovered after his death, he confined himself to a single sentence remark, “God having finished his work of creation, the number of species is in nature fixed and determinate.” (cited in Raven, 1942, p.190) But he is clearly not convinced of this, when he wrote in the Cambridge Catalogue concerning evidence of plant inter-specific hybrids, and concluding that “a true transformation of species cannot be denied” (Ray, 1660).

Ray’s understanding of the species concept was influenced by the Cambridge Platonists. The ideological roots of the “species” concept, one of the most crucial parts of the creation-evolution debate, are illuminated by Landgren (1993) in his paper “On the origin of “species” and as such have far-reaching implications. He showed that the “fixity of species” concept is not a Biblical one but rather can be traced back to classical Greek and Roman thought. Aristotle used the term “species” (Greek “eidos”), derived from Plato’s worldview which consisted of “ideas” or essences. Three hundred years later, the Roman author Cicero chose the Latin word “species” for the Greek “ideos, “idea” or “form”. The Vulgate, Jerome’s Latin translation of the Bible, leaning heavily on Cicero’s terms, translates the original Hebrew word “min” found in Genesis 1 (God created animals and plants according to their kinds or min) as “species”. Thus the Platonic view of the unchangeable form of a being led to the concept of the immutability of species. This imposed itself upon the understanding of Genesis. The error is easy to see when one examines examples of the min, the Genesis kinds, given in Deuteronomy and Leviticus: the kinds or min described there are taxonomically closer to the family rather than the species level (Jones, 1972a,b). These much larger groupings possess considerable capacity for variation within them.

However, the view of the basic type as a Platonic archetype does have validity, and it is highly likely that Ray identified with it in this way, given his affinity with the Platonists. Nonetheless, although these ideas were developed further by Linnaeus, it

FIGURE 3: *Ray commented on the extraordinary instinct of nesting birds: "with such an ardent and impetuous desire of sitting are they inspired….!"*

was not until recent times that basic type biology would be established on foundations that are both scientifically and biblically rigorous (Marsh, 1976, Scherer, 1993).

His Society

He described his rural backwater as "barren of wits." In spite of this Ray instigated a most extraordinarily strong and vibrant network of naturalist friends. He generated a huge volume of scientific letters throughout this network, which was of crucial importance in the days before the establishment of periodicals and journals. Fellow naturalists often assisted him on his field excursions. He had a frequent stream of visitors to stay, and he was a welcomed guest himself throughout the land. He was at home at the Royal Society, turning down the offer of its Presidency.

His Character

Such warm-hearted acclaim from his fellow men rests not only upon his achievements but upon his Christian character. Ray was one of the most genuinely humble of men, never seeking his own preferment, never conceited about his learning, always encouraging his friends to publish, scrupulous to a fault in acknowledging indebtedness, sensitive to the feelings of others, and with a great capacity of friendship irrespective of creed. His was a transparent and pure Christian life, disdaining artificiality in speech and the unwholesome pride of oratory (Raven, 1942, p.65).

According to Raven (1942, p.222), he never advertised his own discoveries or paraded his own research; he was generous in the estimation of the best in others, recognising their work, even those who criticised him; he avoided reference to those whose errors he rejected, except in situations of notorious arrogance; he admitted obligation, even when a debt was trifling, obscuring the originality and scope of his own achievements.

John Ray – a Man for Today

Ray's pioneering spirit, coupled with such commanding, diligent powers of observation and scientific rigour to a degree unheard of, and because his biology was largely rooted in biblical truth, did much to sweep away the medieval myths, superstitions and chaos fettering natural science, and founded many areas of it as academic disciplines. But Ray would have regarded evolutionary theory as the illusionary fable of our age. The need today is for new pioneers to sweep away this modern myth. The Bible speaks into every area of natural science, whether taxonomy and origins, our stewardship of resources, or animal welfare.

Moreover, the scientist who forwards a similar message today in the academic arena often draws fire. Some have lost their jobs. They have walked in the footsteps of Ray as a result. But God was not mocked, and He ordered Ray's situation to be free to accomplish what he might never have achieved because of his lecturing responsibilities at Cambridge. We can take courage from this: God used Ray at Cambridge, and He was able to use him away from it too. God is greater than any institution or convention of man.

Because of his ordination, Ray always viewed himself as a "minister of religion". In this ministry, Ray saw the need to proclaim evidence for a Divine Architect, and the insufficiency of nature alone to generate novelty by chance or naturalistic processes, and he rose to the challenge magnificently. It is significant that John Wesley, so used of God in great revival, drew from Ray's "Wisdom of God" (Curnock, 1751-4). Where is the preaching today that employs such resources? Much of it teaches Creation as a faith position, divorced from science, unlike Ray's beautifully wedded integration of science and faith.

This delightful scholar and noble Christian character was thus a worthy pioneer of biblically-based scientific endeavour. Few men have ever outworked their calling with such inspired reference to creation. He has shown us a path to follow.

SHEENA TYLER

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Ray's other major works (such as Historia Plantarum*) are cited in Webster (1975).*

The name of John Ray is remembered in institutions including: The John Ray Society (publishes scientific monographs by distinguished authors); The John Ray Trust; The John Ray Memorial Gardens and the Museum Gallery at Braintree.

›REFLECTIONS ON EVANGELICALISM DIVIDED.

MIKE MATTHEWS

THERE IS ONLY ONE DIRECT REFERENCE to Creation in this book. Why then should it be reviewed in a journal such as 'Origins'? The reason is that there are so many lessons to be learned which are relevant to us: in particular, the subtle redefinition of 'evangelical', and the complete change in approach to biblical interpretation that goes with it, are exposed here, and this is at the heart of our concern as biblical creationists.

Iain Murray, the undisputed master of current Christian historical authors, charts the changes in Evangelicalism in the last 50 years – in effect answering the question 'how did we get into this mess?' His account is sobering, but I believe one which all thinking Christians should read – and it covers the key issues in Evangelical belief – and unbelief. For at the heart of many of the issues is the lack of true faith: faith in an all-powerful God, who has spoken infallibly.

He covers the rise and influence of Billy Graham, the 'New Evangelicalism', the question of 'Intellectual Respectability' and Scripture, and ecumenism, among others. He draws a number of conclusions, which, whilst they are not the same as the lessons I list below (with the exception of one), I believe are quite compatible with them.

LESSON 1: TO STRIVE FOR 'NUMBERS', 'RESPECTABILITY', OR 'MEDIA COVERAGE' (AT THE EXPENSE OF TRUTH AND FUNDAMENTAL PRINCIPLES, WHICH IS ALMOST ALWAYS THE CASE) IS A LACK OF FAITH, AND DOOMED TO ULTIMATE FAILURE.

Iain Murray has a similar conclusion, that 'the church cannot succeed in the same way in which political parties may succeed.' He sums it up thus (p303) 'Politics has to do with the art of the possible, and with such concessions and compromises as may give a party maximum appeal and influence. But the cause of Christ has never advanced on such a basis. The church is wholly dependent on supernatural aid and without that all success is short-lived and illusory. The biblical principle is clear: 'Those who honour me I will honour' (I Sam 2.30); Not by might nor by power, but by my Spirit says the Lord of Hosts (Zech 4.6)… But the temptation for Christians to diverge from this principle is attractive and it presents itself as a means to obtain a higher good.'

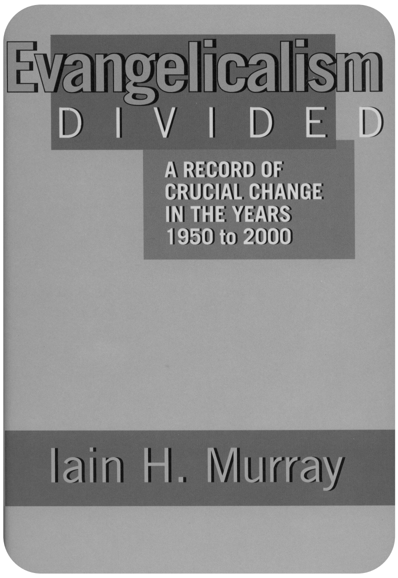
The book provides abundant and sad evidence of how the striving to impress the world has resulted in compromise. To quote again (p304) 'No one supposed that if members of Inter-Varsity gained recognition in the world of university theology they might begin to criticize the faith with which they began, but in a number of cases it has happened. No one thought that if evangelicals could be made bishops or archbishops in the Church of England there would be no stand against heresy, yet so it has proved.'

How does this relate the issue of creation? We need to realize that creation, by an all-powerful God, indeed through Christ, is a doctrine that will always attract hostility from unregenerate man, however logical and 'scientific' it might be. The 'intelligent design' movement has made considerable headway in the US, but it must be remembered that the 'intelligent designer' is not necessarily the God of the Bible – it could be a 'superior intelligence' from outside the galaxy, as some have postulated.

Whilst we must present the truth in a reasonable way – which just increases the culpability of those who refuse to hear – we must not expect it to be accepted by the media or the establishment: in fact we must expect the opposite.

Compromise can start in such a well-meaning way. In the early 1950s the evangelical pastor Harold Ockenga wrote that his aim was not to change any evangelical doctrine, but rather 'to retrieve Christianity from a mere eddy of the mainstream into the full current of modern life.' (p31). In 1977 John Capon wrote that the new generation of younger evangelical leaders' were engaged in 'a continuing quest for a "respectable" theology.' (p175). So we reach the point where 'evangelicals who step into situations where it is professionally unacceptable to teach the infallibility of Scripture come under immense pressure to show that the difference between them and their non-evangelical colleagues is not as great nor as serious as the Bible says it is.' (p210). 'The irony in the Evangelical case is that the emphasis placed upon gaining intellectual credibility for the Evangelical position …may ultimately have the unintended consequence of undermining the Evangelical position.' (p210).

EVANGELICALISM DIVIDED
A RECORD OF CRUCIAL CHANGE IN THE YEARS 1950-2000
By Iain H. Murray
The Banner of Truth Trust, 2000



John Stott is quoted as saying 'Either we are unfaithful in order to be popular, or we are willing to be unpopular in our determination to be faithful (p211). For all their efforts, the book shows that evangelicals were not listened to in academic circles, unless they abandoned their evangelicalism!

LESSON 2: COMMITMENT TO 'VISIBLE' UNITY BEFORE 'DOCTRINAL' UNITY LEADS TO AN *ATTACK* ON SCRIPTURE.

Iain Murray writes 'For the New Testament unity is in order to preserve the faith, not something which can exist irrespective of doctrinal purity. But the price of recognition for (Anglican) evangelicals was that they had to accept… that the church … unity is the *first* priority… At Nottingham, evangelicals agreed: 'As Anglicans, holding to the Church of England's historic reformed stance, we also believe that to attempt to gather a "pure" church is not only impossible as a task but also contrary to our biblical understanding of the visible church.' Similarly, Packer, Beckwith and Duffield, speaking of evangelical Anglicans, wrote in 1977: 'Their concern that the Church's purging and renewing should not bring fresh division makes them willing to endure for the moment grave doctrinal disorders…"

As Murray points out, something grave has happened when evangelicals treat visible 'unity' as more important than doctrine. Inevitably this means that, when the two are opposed, Scripture will be suppressed or ignored: and Murray illustrates this graphically in the following pages.

Whilst we wish to take a stand with fellow Christians, if we do so with those who are not committed to Scripture, and thus to (biblical) creation, then sooner or later we will find both our Bible and ourselves under attack from those who we thought were our friends. This leads on to the further lesson:

LESSON 3: WE NEED BOTH GOD'S WORD AND OUR WILLING SUBJECTION TO THAT WORD.

Abandonment of Scripture as our absolute and authoritative framework leads inevitably to the wilderness: and without faith we will still misinterpret those scriptures!

It is clear from the book that numbers who call themselves evangelical have felt forced to soften their stance on biblical authority. Anglican evangelicals who served on the C of E doctrine commission are quoted as giving their full endorsement to the text 'The Mystery of Salvation', which contains the quotes 'The idea of the fall does not require a prior paradise and the claim that physical death is the result of Genesis 3 is 'impossible'', and 'Traditions… drove Paul to formulate the view that Christ died for us while we were helpless', also 'For many Christians today the idea of God offering himself as a substitute for our sins is deeply repellent.' (pp 145/6).

The result of such compromise was that many evangelicals thought there was no alternative and 'fundamentalism' was intellectually unacceptable. One writer put it like this 'It may well be… that there remains no real alternative… between an intellectually archaic and fundamentalist sectarianism… and absorption… within an ecumenical Catholicism upon the other.' (quoted p150). Iain Murray rightly says that '…the new Testament shows that one sure test of a Christian profession is how that person reacts to the Scriptures' (p153), and furthermore quotes Martin Luther 'The truth is that nobody who has not the Spirit of God sees a jot of what is in the Scriptures. All men have their hearts darkened, so that, even when they can discuss and quote all that is in Scripture, they do not understand or really know any of it.' (p155).

The Biblical Creation Society takes its stand on that first word – Biblical. It is not at one with all creationists, but with all who take their stand on scripture – creation is just one of many biblical doctrines. It will inevitably therefore find itself in opposition to many who call themselves 'Christian' and 'evangelical' who do not believe in the infallibility and inerrancy of God's Word. Indeed, there are also those who claim the name 'Christian' but who are unregenerate, and they will oppose the truth, even though they may claim to base their arguments on Scripture.

Which leads on to my next point:

LESSON 4: UNREGENERATE MAN WILL ULTIMATELY FORSAKE THE TRUTH AND LEAD MEN ASTRAY.

William Tyndale, in the 16TH century (quoted p248) said that 'Antichrist will ever be the best Christian man.' Murray writes 'The idea that Christianity stands chiefly in danger from the forces of materialism, or from secular philosophy, or from pagan religions, is not the teaching of the New Testament. The greatest danger comes rather from temptations and those who, using the name of Christ, are instruments of Satan to lead men to believe a lie and to worship what in reality belongs to the demonic' (p259).

The book is replete with examples of how those in the church have drawn men away from the truth, and undermined their faith – sometimes unwittingly. These are vivid illustrations of the warnings in Scripture against false prophets. Some 35 years ago, Dr. P. E. Hughes (an Anglican) sounded the alarm. He believed that they were seeing 'the rise and swift spread of antichristianity within the Church' and that 'this is the assassination of Christianity and its gospel.' (p290). Subsequent history has fully justified his concerns. On Sunday Worship, broadcast on BBC Radio 4 on 15TH Sept 2002, the service from St James' Priory in Bristol contained pagan mystic poetry, the image of God the Father suckling children, worship of God as 'mother', and the promotion of women priests and same-sex unions.

Ultimately it will become clear where true allegiances lie. On p222, Alister McGrath (a professed evangelical) is quoted as writing in 1994 that as evangelicals we have more in common with Rome than Islam, indeed than with 'mainline protestantism'. But today this can hardly be claimed to be so. The Pope in speaking to Muslims suggested that they serve the same God (Evangelical Times, March 2002). Specifically with regard to creation, the Roman Catholic and Anglican churches are united in their acceptance of evolution (Guardian, 9TH March 2002). As Murray says (p269) 'there is an irreconcilable enmity between Satan and Scripture.'

LESSON 5: THE FURTHER UP THE LADDER, THE MORE COMPROMISE.

Ecclesiastical promotion has been an effective way of silencing dissenters, just as troublemakers in the House of Commons were frequently 'booted upstairs' to the Lords in order to keep them quiet. Murray comments 'The approval of doctrinal 'diversity' has become the hallmark of one-time evangelicals who have risen to high positions in the Church and left definite convictions behind them.' (p142). On p118 Gerald Bray is quoted as writing 'As evangelicals work their way into the structures of the Establishment, so they are forced to compromise.'

I suspect that there are similar temptations for scientists. After all, you are unlikely to get promotion and research funds by being a creationist! Thankfully, there are a few who have achieved high positions – even professorships – without compromise, but the pressure to keep quiet about creation is always there.

LESSON 6: LOVE FOR THE SOULS OF MEN MEANS LOVE FOR THE DOCTRINE. CREATION IS A GOSPEL ISSUE.

As Iain Murray makes clear throughout his book, the underlying disagreement between the true evangelicals and others is over the question 'who is a Christian?' In seeking numbers, a wider unity, intellectual respectability, and visible acclaim, this issue had been glossed over, for these things are incompatible with the Bible's teaching on the nature, plight, and salvation of man. But if we care about the everlasting destiny of men, then we must hold firm, for their sakes, to all the truths of scripture. We cannot drop one or two 'unnecessary' doctrines in order to make the truth more acceptable. If we do that with parts of Scripture, then ultimately it is all brought into question.

More than that, creation is not just an incidental – it is integral to the whole fabric of scripture and its teaching. Paul's teaching on the second Adam is meaningless without the first Adam. If death was not introduced by the fall, but is the means by which we 'evolved', then God has told us lies. Without creation and the fall, without Genesis as history, we have no gospel. As Paul says of the resurrection, if it is not true, we are still in our sins, and of all men most miserable.

As the author makes clear, this is not to say that a *belief* in creation is essential to salvation: just that the *truth* of creation is so! 'Yet what should be clear to Christians is the inconsistency of affirming belief in the gospel and not in all Scripture. For no saving belief is possible without conviction concerning the underlying authority of Scripture as divine revelation. If we can trust Scripture only as far as our reason can accept it we are not Christians at all.' (p312)

CONCLUSIONS: There are many other relevant passages from the book that I could quote, and other relevant lessons that can be drawn. It is a sad but compelling and necessary read. What then are the general conclusions we can draw from the lessons enumerated above?

- We must indeed strive to bring the truth and its' reasonableness before all people (including our children in the schools): but there will be hostility and opposition just because it is the truth. Creation is not 'neutral'. Without a widespread movement of the Holy Spirit, the world will believe the lie, however stupid that lie is shown to be.
- We must take our stand with those who adhere steadfastly to the infallible, inerrant Word of God. We can make use of 'extra-biblical' arguments to show the truth of Romans 1:20, but ultimately we must be clear on our ultimate source of authority. Any weakening in our position on Scripture will ultimately mean that we stand on sand, which will be washed away from under our feet.
- We must recognize that our task is not ultimately a scientific one – it is a matter of faith, a gospel issue. If we do not recognize that, we will surely lose heart in our promotion of creation, as we come to see that 'scientific objectivity' is an illusion. Rather, we are concerned that men and women are reconciled to their creator, through the One by whom and for whom all things were created.

MIKE MATTHEWS

›COMETS STILL PUZZLING ASTRONOMERS.

PAUL GARNER

Where did comets come from and how old are they? Most astronomers regard comets as icy remnants of a nebula that gave birth to the planets about 4.6 billion years ago. However, this idea faces a number of problems, not least that the estimated lifetime of comets appears to be much less than the conventional age of the solar system. Comets lose material every time they pass close to the Sun, and this places a limit on the number of orbits they can survive. For this reason, the origin and age of comets has been much discussed in the creationist literature, the latest review paper being Faulkner (1997).

To resolve the problem of comet lifetimes, it is usually assumed that there is a reservoir of icy bodies on the outer fringes of our solar system that occasionally replenishes those comets that have decayed. This hypothetical reservoir is called the Oort Cloud, after the Dutch astronomer who first suggested it. The theory says that every now and then an icy object gets 'kicked' from the reservoir into the inner solar system and loops around the Sun. Most of these objects head out of the solar system and are lost altogether, a few collide with the Sun and are swallowed up, but some are 'captured' into new orbits and become comets.

A long-standing puzzle has been why, if this theory is correct, astronomers don't observe hundreds of times more returning comets than they do. One proposal has been that the volatile gases that make up the glowing heads and tails of these objects become depleted – and so they become asteroid-like. However, a new study led by Harold Levison of the Southwest Research Institute at Boulder, Colorado, suggests that not enough asteroids are being discovered for this to be the answer. The alternative proposal of Levison *et al* (2002) is that the objects simply break up.

"This implies that what's happening to these things is that they disintegrate," says Levison. "Ninety-nine percent of them disintegrate." (Britt, 2002). Comet LINEAR provided a dramatic example of this in July 2000. Astronomers were surprised when the nucleus of the comet broke apart following its passage around the Sun – leaving a small armada of 'mini-comets' in its wake.

The study by Levison *et al* is also the first to suggest that Oort Cloud comets have a different composition to those said to have originated in a nearer reservoir called the Kuiper Belt. The researchers claim that Kuiper Belt comets do not disintegrate as readily as Oort Cloud comets: "Here's a population of comets that just go 'poof' and disappear," said Levison. "The other doesn't." (Britt, 2002).

This study reminds us that there is still much that is unknown about comets. In a note accompanying the Levison paper, Mark Bailey of the Armagh Observatory says that comets "remain a puzzle" (Bailey, 2002, p.2153). However, it is worth noting that some of the puzzles seem to be a consequence of the framework in which the data are being interpreted. The shortfall in predicted numbers of comets – which Levison *et al* seek to explain – is a product of the Oort Cloud hypothesis. If, as creationists suspect, the solar system is relatively young, then there is no requirement for the Oort Cloud at all – and so the number of expected comets might be quite different. We also note that observations of disintegrating comets point powerfully to their limited lifespan. Rapid break-up merely compounds the problem of why comets still exist if our solar system is so old. For evolutionary models, the continued survival of such ephemeral objects remains a mystery. Mark Bailey writes: "Perhaps, as with previous questions concerning the origin of comets, astronomers are collectively missing a trick." (Bailey, 2002, p.2153). Might the "missing trick" be the need for a fundamental re-examination of conventional views about the origin and age of our solar system?

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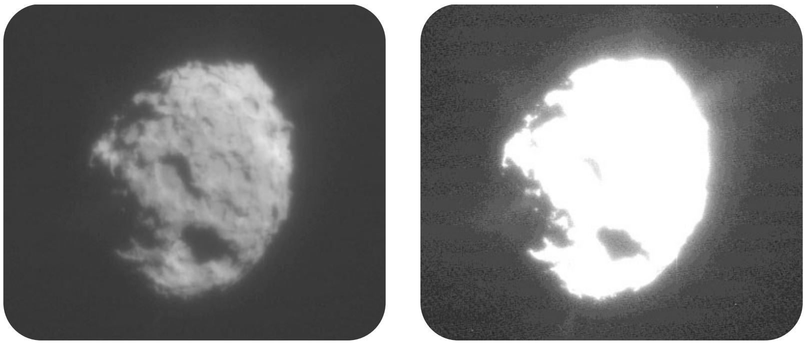

Comet Wild 2 is shown in this image taken by the Stardust navigation camera during the spacecraft's closest approach to the comet on January 2 2004. The image was taken within a distance of 500 kilometers (about 311 miles) of the comet's nucleus with a 10-millisecond exposure. http://stardust.jpl.nasa.gov/news/status/040102.html

›A WHALE OF A TALE.

DAVID J TYLER

In the south-western coastal region of Peru is an unusual geological deposit called the Pisco Formation. There are many different types of sediment, but the most interesting is diatomite. A diatom is a microscopic marine organism that possesses a remarkable siliceous body called a frustule. A sediment composed predominantly of frustules is known as diatomite. In modern ocean basins, diatom frustule and mud accumulation rates are low (one study off the coast of California reported a rate of 40-73 cm of sediment in a thousand years).

The lower part of the Pisco Formation is mostly sandstone with some diatomaceous units. The upper part, about 80 metres thick, has diatomaceous units plus mudstones with volcanic ash. Within this unit are fossil baleen whales, 5-13 metres long, many of which are extremely well preserved. In recently reported research (Brand *et al*, 2004) concentrating on a small hill called Cerro Bianco, 346 whales were studied in a 1.5 square kilometre area of exposed ground. These fossils occasionally preserved soft tissues, including baleen. The only other common fossils are sharks teeth, but the Formation has also yielded fish, turtles, seals, porpoises, penguins and ground sloths.

The researchers noted the excellent preservation of many of these whales and inferred that rapid burial was essential to avoid the bones being disarticulated and dispersed. The puzzle begins here, for how could this be, when diatomaceous sediment takes so long to accumulate? Is it reasonable to talk about several thousand years of sedimentation before a whale is even covered, let alone fossilised?

The researchers tested three hypotheses about the field data. 1. Anoxia in stagnant water, preserving the whale while sediment accumulated slowly. 2. Diatom mats were rafted in to cover the bodies and inhibit scavengers. 3. Rapid burial by diatomaceous sediment. Their paper discusses relevant observations, rejects options 1 and 2, and concludes that option 3 is supported by the evidence.

"This necessity of rapid burial indicates that, at times in the past, diatom accumulation rates were much higher than those typical in modern oceans." The mechanisms suggested are abundant diatom blooms offshore (*i.e.* an "explosion" of the diatom population as a result of abundant food supply and favourable conditions for reproduction) combined with currents bringing frustules to a region of accumulation.

In geological literature, diatomaceous deposits have been presented as an example of a sediment type necessarily requiring long periods of time to accumulate. This research documents a convincing case of these sediments accumulating over much shorter timescales and it succeeds in injecting a catastrophist alternative to what has hitherto been a uniformitarian stronghold.

The presence of volcanic ash in the diatomaceous sediment is an indication that this region of Peru was experiencing volcanism at that time, and the volcanism offers a possible mechanism for supplying minerals to ocean waters to stimulate diatom blooms. The rapid generation and accumulation of frustules, the demise of a school (or schools) of whales caught up in the catastrophe, together with other observations made by the research team, provides a coherent scenario for interpreting the data.

The lead author, Leonard Brand, is also the author of a valuable book (Brand, 1997) that develops the theme of catastrophist geology and biblically-based approaches to earth history. This research paper can be seen as an expression of the principles contained in Brand's book.

DAVID J. TYLER.

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›THE FIFTH INTERNATIONAL CONFERENCE ON CREATIONISM: A REPORT

PAUL GARNER

The small town of Beaver Falls, Pennsylvania, hosted the Fifth International Conference on Creationism (ICC) between 4th and 10th August 2003. Three hundred and twenty-five people attended the conference, which is widely regarded as the premier meeting of its kind. The venue on this occasion was Geneva College, a Christian liberal arts college founded in 1848. The college campus was a pleasant setting for what was a most stimulating time of fellowship, debate, and learning.

There were about 40 speakers and a variety of papers. The subject areas included geology, palaeontology, astronomy, biology, history, and archaeology. Two tracks ran simultaneously – a technical track presenting the results of original peer-reviewed research, and a basic track offering overviews of key aspects of the creation model. There were also evening sessions that were open to the public – with speakers including John Morris, Ken Ham, and Steve Rodabaugh. In this article, I will summarise some of the presentations. It was impossible to attend all the talks and inevitably my report reflects my own interests and choices.

The conference began with a plenary session at which Larry Vardiman gave an overview of the RATE project. RATE stands for Radioisotopes and the Age of The Earth. The RATE group is a team of geologists, geochemists, and physicists convened by the Institute for Creation Research (ICR) and the Creation Research Society (CRS). They are engaged in an ambitious project to investigate young-earth interpretations of the multi-million-year ages derived from radioisotope dating methods. The team has already issued a major 676-page book, which set the stage for their five-year research programme (Vardiman, Snelling and Chaffin, 2000). A second book, on which work has already begun, is scheduled for the end of the research phase in Autumn 2005. There will also be a layman's version of the RATE research, authored by Don DeYoung.

An important contribution was made by Russell Humphreys: *Helium Diffusion Rates Support Accelerated Nuclear Decay*. Two decades ago, there were reports of surprisingly high amounts of nuclear-decay-generated helium in tiny radioactive zircon crystals (embedded in mica) from the Jemez Granodiorite (Precambrian) of New Mexico. Up to 58% of the helium expected from 1.5 billion years of decay was still in the zircons. Why hadn't the helium diffused out of the zircons and into the atmosphere? One explanation was that accelerated nuclear decay in Earth's past had generated over a billion year's worth of helium in only a few thousand years, and that the helium simply had not had enough time since then to escape. However, until recently, no-one had performed the experiments that would allow this hypothesis to be confirmed or refuted. In 2000, the RATE project began experiments to measure the diffusion rates of helium through zircon and mica. This paper reported the results of those experiments. The measured diffusion rates are consistent with an age for the Jemez granodiorite of between 4,000 and 14,000 years, thus supporting the hypothesis of accelerated nuclear decay and the short time-scale of Scripture.

Andrew Snelling gave three papers based on his work for the RATE group. The first was entitled *Radiohalos – A Tale of Three Granitic Plutons*. *Radiohalos* are tiny zones of discolouration produced by decaying radioactive nuclei in minerals. For some years, there has been debate about the origin of these halos, particularly the so-called 'parent-less' polonium halos. These issues were brought to the attention of the creationist community in the 1980s by Robert Gentry, who argued that the polonium halos were evidence of the *fiat* creation of the rocks that contain them (Gentry, 1988). However, until now, the geological distribution of these halos has been poorly understood. Andrew collected samples from three granite bodies that could be shown to intrude fossil-bearing sediments and/or could be shown to have been derived by the partial melting of fossil-bearing sediments. In other words, these could *not* be created rocks – yet all three plutons contained polonium radiohalos. This effectively falsifies Gentry's Creation Week hypothesis. Instead, Andrew proposed a model in which hydrothermal fluids separated polonium isotopes from their parent, transported them very short distances, and then chemically concentrated them into radiocentres. The very short half-lives of these isotopes require this transport process to be rapid (within days), suggesting that the plutons were formed and cooled within very short time-scales. This was an important contribution to our understanding of radiohalos, and provides us with intriguing clues to the rapidity of geological processes in Earth's past.

The second of Andrew Snelling's talks was on radioisotopic dating studies of the Somerset Dam layered gabbro intrusion of southeast Queensland. The intrusion is conventionally regarded as Upper Triassic in age. However, an excellent 15-point K-Ar isochron suggested that the conventional 'age' should be revised to 174+/-8 Ma (Middle Jurassic). Furthermore, new whole-rock determinations using the K-Ar, Rb-Sr, Sm-Nd, and Pb-Pb systems yielded discordant 'ages'. The discordancies were understood in terms of accelerated nuclear decay in the Earth's past, with the longer half-life beta-emitter ^{87}Rb being accelerated to the greatest extent. Evidence was also presented that the intrusion had inherited the radioisotopic signature of its mantle source.

Andrew's third contribution was a paper on the genesis and history of recent andesite flows at Mt Ngauruhoe. This volcano, in the Taupo Volcanic Zone of New Zealand, erupted andesite lavas in 1949 and 1954, and avalanche deposits in 1975. As expected, Rb-Sr, Sm-Nd, and Pb-Pb isotopic analyses of these lavas did not yield any 'age' information. However, they did provide information about the depleted mantle source for the parent magmas and the crustal contamination that produced andesites from them. It is probable that radioisotope analyses of ancient lava flows likewise reflect the origin and history of the mantle and crustal sources from which they were generated, rather than valid conventional 'ages'.

Steven Austin also presented a paper on isochron dating – applied to an Upper Precambrian dolerite sill at Bass Rapids, Grand Canyon. Since 1982, with the publication of a Rb-Sr whole-rock isochron, the age of this sill has been accepted as 1.07 billion years. However, this paper reported discordant isochron 'ages' for the sill ranging from 841.5+/-164 Ma (whole-rock Kr-Ar) to 1375+/-170 Ma (mineral Sm-Nd). There was significant discordance between K-Ar, Rb-Sr, Sm-Nd, and Pb-Pb results but, intriguingly, each method appeared to yield internally-concordant 'ages' between whole-rocks and minerals. For example, the Rb-Sr whole-rock and mineral isochron 'ages' were 1055+/-46 Ma and 1059+/-48 Ma, respectively. The results are consistent with the hypothesis of changing radioisotope decay rates in Earth's past: alpha decay having been accelerated more than beta decay, and longer half-life isotopes experiencing greater acceleration.

Two other RATE papers are worthy of comment. John Baumgardner discussed the implications of detectable ^{14}carbon in organic samples from throughout the Phanerozoic. During the question time, the issue was raised as to how ^{14}carbon, with its short half-life, managed to survive the hypothesised period of accelerated decay, while other short-lived isotopes became extinct. This matter was not resolved to the satisfaction of many listeners. Eugene Chaffin addressed the conference on theoretical models of accelerated nuclear decay. This paper also attracted its share of critical comment, with some questioners wondering whether the speaker's reliance on string theory provided the best approach.

One of the highlights of the conference was a paper by Steven Austin on the mass kill and burial of nautiloids – squid-like creatures with a chambered shell – in the Redwall Limestone of Grand Canyon. In an entertaining and engaging presentation, Steve explained how he had discovered a regionally-extensive limestone bed with abundant orthocone (straight-shelled) nautiloids of the genus *Rayonnoceras*. The area of the nautiloid bed exceeds 3 x 10^4 km^2 and the volume exceeds 100 km^3. It is estimated to contain between one billion and ten billion nautiloids! Curiously, they are concentrated in the middle of the two-metre-thick bed – not at the bottom. Furthermore, about 15% of them stand vertical within the bed. Steve presented evidence that the layer was deposited by a fast-moving, dense, sediment gravity flow which was moving westward through northern Arizona. A large population of nautiloids was swept up, smothered within, and buried by the flow. The importance of this discovery has been recognised by the National Park Service, to whom Steve has presented his technical report.

Steven Austin's nautiloid paper was complemented by Darry Stansbury's study of the Anchor Limestone of southern Nevada. Very large cross-beds (7.5 metres high) in the Anchor Limestone seem to be the preserved remnant of an enormous underwater dune with an original height estimated conservatively at 15 metres and a length of about 800 metres. The dune was laid down on a marine slope in water about 140 metres deep. The velocity of the flow that deposited the dune was estimated conservatively at 2.5 m/s toward the west. This enormous dune was interpreted as the distal deposit formed by the breakdown of the sediment gravity flow that buried the nautiloids in northern Arizona. Limestones, usually associated with slow deposition in calm tropical seas, might be regarded as the last domain of rigidly uniformitarian thinking about Earth history – but these studies are challenging that consensus.

John Woodmorappe gave a talk entitled *Collapsing the Long Bristlecone Pine Tree Ring Chronologies*. These chronologies allegedly span 8,000 years and have been the subject of much critical discussion in the creationist literature. Commendably, John had conducted his own personal study of the bristlecone pine chronologies, including fieldwork in the White Mountains of California. Much to the consternation of some conference attendees, John argued that the crossmatching of the tree ring series behind the bristlecone pine chronologies appeared to be substantially sound. He also argued that not enough was known about processes leading to plural annual rings for further consideration of this hypothesis. He proposed a new model of non-climatic 'overprinting' of incipient tree rings in a time-transgressive manner. In other words, the crossmatches were the result of event-correlation rather than time-correlation. According to this model, less than 1,000 years of real time has become inflated to over 4,000 years of apparent time. Scepticism about this proposal was expressed during the question time and around the dinner tables later. Most questioners seemed keen to explore further the possibility of multiple annual rings before ruling it out.

It was good to see Kurt Wise back in action following the devastating fire in February 2000 at Bryan College. Having lost his library, notes, and slide collection, Kurt's research was set backthree years. Kurt's two contributions to the conference were attempts to reconstruct pre-Flood environments. His first paper was called *The Pre-Flood Floating Forest: A Study in Paleontological Pattern Recognition*. The first appearance of higher plant taxa in the fossil record occur in an order which correlates strongly with the order of evolutionary branching predicted from published cladograms. The probability that this pattern could be arrived at randomly is so low that an explanation must be sought within the young-age creation model. Pointing the way to a solution, it was noted that the order of first appearance also correlated with increased terrestriality of the taxa. Kurt proposed that the destruction of a pre-Flood floating forest biome during the Flood explains this trend. He envisaged a pre-Flood forest growing out over the ocean through an ecological succession of plants of steadily increasing size – in a fashion analogous to the plants of modern quaking bogs. Also living in the floating forest would be a succession of Palaeozoic animals, such as the aquatic Devonian tetrapods. Residual catastrophism after the Flood may have prevented the floating forest becoming re-established and resulted in the extinction of most of the Palaeozoic plants and tetrapods. Long-standing BCS members will be familiar with the pioneering work of Joachim Scheven, upon which Kurt has built his new model (Scheven, 1981).

Kurt's second paper was entitled *The Hydrothermal Biome: A Pre-Flood Environment*. A diverse assemblage of animal phyla appears suddenly at the base of the Cambrian (the Palaeozoic fauna). At the top of the Precambrian, we have small, shelly fossils (the Tommotian fauna), underlain by the famous Ediacaran fauna. However, below this level, there are only bacterial, protist, and algal fossils – and no definitive evidence of animal, fungal, and plant fossils. This paper attempted to explain this fossil succession in terms of a Flood model. Kurt noted that each of the faunas is typically associated with a particular sediment type, suggesting that the succession is ecological rather than evolutionary. He proposed that the faunas represent adjacent pre-Flood ecologies that were buried during the transgressive phase of Noah's Flood. His model suggests that the pre-Flood continental shelf housed a spectrum of marine ecosystems from the margin landward: (a) a shallow-water, hydrothermal, stromatolite reef environment; (b) a deep-water, sandy environment with an Ediacaran bottom-dwelling fauna; (c) a carbonate environment which was home to the Tommotian organisms; and (d) a muddy environment populated by the Palaeozoic fauna. As with the floating forest, the extinction of many of these creatures was explained by the failure to regenerate the same protective regime in post-Flood times. Stromatolites and thermophilic bacteria are today relegated to relict localities such as mid-ocean ridges and hypersaline intertidal environments.

Wayne Spencer gave a talk on *Tidal Dissipation and the Age of Io*. The discovery of active volcanism on Jupiter's moon, Io, in 1979 led to much research into its heat output. Heat radiated from Io's surface is on the order of 10^{14} Watts. Evolutionary models of Io's heat flow involving tidal dissipation were reviewed and critiqued. It was concluded that they have various problems, such as not matching infrared observations, not accounting for known orbital parameters, or not being viable over billion-year time scales. Io is not moving outwards from Jupiter as the tidal dissipation mechanism predicts. An additional problem is that there is no volcanism on Europa or Ganymede, though tidal dissipation also affects them. Wayne concluded that an age for Io of less than 10,000 years was a plausible solution to the Io heat problem and that there may have been more vigorous heating of Io in the past than today. Perhaps there is a link here with the RATE group's hypothesis of accelerated nuclear decay?

Judy Young gave a scholarly defence of the Septuagintal chronology of Genesis 5 and 11, arguing that it had a stronger claim to authenticity than the lower ages reported in the Masoretic Text or the Samaritan Pentateuch. While I am unqualified to comment on Judy's arguments, I note that a former professor of New Testament, who had taught textual criticism, commended Judy on her thorough work. However, he also asked to what extent Judy's efforts were 'need-driven', to provide more time for scientific modelling of the post-Flood period.

Also worthy of comment were the papers given by four members of the Baraminology Study Group (BSG), which was founded in 1996 for the purpose of bringing researchers together to develop creationist biosystematics. In an exciting development, the BSG is soon to become a full-fledged society for creation-based biology (BSG website).

Todd Wood gave a talk entitled *Perspectives on AGEing, A Young-Earth Creation Diversification Model*. This model, first proposed in 1999, says that diversification within the created kinds (baramins) occurred because of the action of transposable and repetitive elements, called Altruistic Genetic Elements (AGEs). Todd presented new evidence that supports the model – and some which calls for it to be significantly revised. Evidence of AGE/gene association, AGE horizontal transfer, and AGE-induced genetic changes all support the original model. However, evidence of extensive genomic rearrangement, bacterial plasmids, and AGE transposition control require substantial modification of the original concept. Todd introduced the idea of genomic modularity to refer to genomic rearrangements associated with diversification within baramins. According to the modularity concept, genomes were designed to be dynamic, not static. There is evidence that genomes respond to environmental stress by chromosomal rearrangements. Todd's current thinking is that AGEing is likely to be a minor feature of genomic modularity.

David Cavanaugh presented a baraminological study of nineteen fossil horse species using a morphological dataset obtained from the published literature. Baraminic distance correlation analysis suggests that all nineteen species belong to a single monobaramin. (A monobaramin is defined as a group of organisms within which all members share continuity with at least one other member.) A three-dimensional Analysis of Pattern (ANOPA) distribution also reveals a linear trajectory of horse species with sixteen species in the main axis and three in a side-branch. The order of species in the trajectory closely corresponds to the order of stratigraphic appearance, indicating that they constitute a genuine stratomorphic series. This was interpreted as the result of rapid, post-Flood, within-kind diversification – confirming the conclusion of my *Origins* article on fossil horses in 1998.

Matthew Croxton of the Baraminology Study Group gave a talk entitled *Rafting: A Post-Flood Biogeographic Dispersal Mechanism*. He proposed that plants and animals rafted across oceans on and among masses of logs, plant debris, and vegetation mats in the first few centuries after the Flood. During his talk, Matthew gave numerous examples of disjunct distributions that coincide with modern ocean currents. These distributions appeared to be better explained by rafting than by any alternative model. Furthermore, the rafting hypothesis is readily testable – eighteen predictions of the model are offered in the published version of Matthew's paper.

Finally, Roger Sanders introduced us to *The Cognitum: A Perception-Dependent Concept Needed in Baraminology*. The cognitum (plural, cognita) is defined as a group of organisms recognised through the human cognitive senses as belonging together and sharing an underlying, unifying gestalt. The concept implies that, at creation, organisms were endued with characteristics that elicit a unique, divinely-created psychological response in humans and that, after the Flood, the descendant species of the surviving representatives of the baramins retained these characteristics. Studies using cognita promise to reveal patterns of cross-baramin design, why a particular group is recognisable, which combination of characteristics disrupt the recognisability, and what that group tells us about the Creator. An additional benefit might be construction of a creation classification long before most baramins are rigorously identified.

The Fifth ICC was encouraging for three reasons. First, there were healthy signs of maturity – speakers were not afraid to challenge cherished ideas where necessary. Some found this disconcerting but, if creationism is to move forward, there must be a willingness to be self-critical and to reject ideas that are unworkable. Second, the peer-review and scholarship of the conference was commendable. The standard of many of the presentations was high and future conferences need to build upon this. Third, it was gratifying to see how many of the papers were the fruit of collaborative and multi-disciplinary research – the contributions of the RATE group and the Baraminology Study Group were prime examples of this trend. Thankfully, the days of the 'lone ranger' creationist are coming to an end.

Usually the ICC is held every four years, but for logistical reasons there had been a five-year gap since the last conference in 1998. This was a shame because it meant that the ICC was held in the same year as the European Creationist Congress, which partly accounted for the low representation from Europe among speakers and attendees. However, for those who were unable to make the conference itself, there is a *Proceedings* volume that includes all the technical presentations (Ivey, 2003). For details, please visit the ICC web site. Additionally, the RATE papers have been made available on the web site of the Institute for Creation Research.

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›CAMBRIDGE'S CHRISTIAN HERITAGE.

RANALD MACAULAY

September is a golden month in Cambridge, not simply because of the usual autumn glow but because a stillness seems to come over the place. The number of tourists dwindles after the summer rush and the students have not arrived yet. It is, though, 'Cambridge Conference time' and from Christian Heritage's point of view the significant change this brings is the number of academics from around the world who visit and come on our guided walks.

The weekly walks have, with only a couple of exceptions in my case, been more than well attended throughout the summer. Last Wednesday, for example, I went out with 28, 15 of them from a language school and the largest group from Japan.

What never fails to intrigue people on these tours is my comment about the hi-jacking of modern science. The ante-chapel at Trinity has, amongst others, statues of Francis Bacon, Sir Isaac Barrow (Newton's teacher) and, in pride of place, Newton himself. Standing next to Bacon's statue I draw attention to his famous 'Novum Organum' ('the new tool') of 1620, and then make the point that some have viewed this book as 'the trap-gate of history'. By which I mean an entirely proper enthusiasm for the experimental method in the early 17century, was soon elevated, sadly, even by Bacon himself towards the end of his life, above God's written Word. A mindset slowly emerged which upended, perhaps unintentionally to begin with, the critical axis of the pre-modern world; the horizontal of science and nature displacing the vertical of God and his revelation to sinners. Hence science became more important than God and mathematics more important than salvation - thus leading to the trap within which the western world now finds itself. For the end of an impersonal force working upon impersonal matter is, of course, meaninglessness. And science too, ironically, loses its internal coherence.

After saying all this, what then surprises me is the general agreement these observations elicit and, better still, the sense of gratitude that they have even been mentioned. In fact, people seem to be glad to be reminded about God and his creation and even if they are not, this is, of course, where the gospel starts as Hebrews 11:6 insists. If academia throughout the western world has one supreme need, in my view it is the understanding once-again that 'in the beginning was the Word. and that through him all things were made.' (John 1:1&3)

RANALD MACAULAY (coordinator)

For more of Francis Bacon please see Origins 35, July 2003, 2-5.

›MODIFYING CREATION?

GM CROPS AND FOODS: A CHRISTIAN PERSPECTIVE

EDITED BY:
DONALD BRUCE AND DON HORROCKS

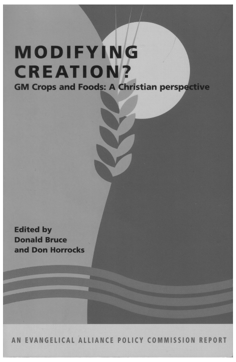
PUBLISHER: EVANGELICAL ALLIANCE POLICY COMMISSION

DATE: 2001

ISBN: 1 84227 100 8

182 PAGES, PAPERBACK £7.99

BOOK REVIEW BY:
DAVID J. TYLER



The commercialisation of genetically-modified (GM) crops continues to expand. This book records the year 2000 figure of 44.2 million hectares. The recently-released figure for 2001 has a 19% increase, although this is still concentrated in four countries: USA (68%), Argentina (22%), Canada (6%) and China (3%). Europe has opted out of commercial exploitation of GM technologies for the present, largely because of firm consumer resistance.

The Evangelical Alliance's Policy Commission has set out to research the controversial issue of genetically-modified (GM) food and crops, develop a Christian response and suggest appropriate policy statements and affirmations. Ten chapters explore key issues systematically and in an informative way. The working party reports differences of opinion, and these are sometimes apparent in the text.

Chapter 2, dealing with the science of plant breeding and genetic modification, will help readers who are not acquainted with the technology of GM crop development. However, it gives almost no insight into scientific concerns. Two pages only are devoted to objections, and there is no attempt to be specific. Only one scientist voicing concerns is mentioned and he is criticised thus: "there is no acknowledgement at all of the very well-founded paradigm that individual genes have individual biochemical functions that can be studied individually." Of course there is no acknowledgement – this paradigm is being challenged! This issue is at the heart of the scientific debate and it really ought to be explored in some depth.

My reading of this chapter is that the complexity of genetic interactions in living things is underplayed. The evidence is growing that genes have multiple functions. It is my understanding of the Human Genome Project findings (humans have only 30,000 genes) that this has given an enormous challenge to the principle that individual genes have individual biochemical functions. Concerned scientists have pointed out that the more we understand of the way gene promoters work, the more we find that the gene functions are all entangled. There is little in this chapter that shows the scientific objections to GM technologies are taken seriously by the writers, and this does not help achieve the book's stated objective.

Subsequent chapters address questions like "Is it wrong to do genetic modification?", "What sort of farming should we adopt?", "Is GM just a powerful tool in the hands of the powerful?" and "Is GM needed in the developing world?" The authors recognise that the issues are much broader than whether GM technologies are sound. In general, these chapters are helpful, well-researched and they do help to articulate a Christian perspective.

However, the chapter on environmental and health risks left me with more questions than answers. The authors argue that we cannot escape risk and that there are risks involved in being creative with any technology. Whilst this is true, the reality of "risk" does not provide us with a warrant to indulge in risk. The authors use the phrase "a context of wisdom and prudent risk management", but do not elaborate. Have we achieved this "context" in the GM story up till now? Here we have the tension again. Some parts of the book make it appear that we have. Other parts of the book point to imprudence: the hasty commercialisation of the technologies and examples of exploitative behaviour. Those opposed to GM crops and foods will suggest that a "context of wisdom and prudent risk management" necessarily means ceasing to commercialise GM products for the time being.

As a "case study" to illustrate these problems, consider the "Golden Rice" product that has enhanced Vitamin A and which was developed with the nutritional needs of developing countries in mind. It is mentioned on page 35 as an application of GM, significant because it is a GM product not developed for Western markets. The book's discussion gives little idea of the serious objections that have been made to Golden Rice.

Those wishing to follow this up are referred to the Audit Report if the Institute of Science in Society (accessible from http://www.i-sis.org/). Most of the problems of Vitamin A deficiency have arisen in countries that have adopted "Green Revolution" monocultures in farming and have chosen to follow the practice of Western countries in polishing the rice (removing existing sources of Vitamin A). The alternative strategy of (1) refraining from polishing rice, and (2) adopting greater variety in the crops under cultivation for local consumption, is considered to be much more sustainable in the audit. "Modifying Creation?" has identified the right principles, but the authors do not seem to be able to apply them consistently to real world issues.

There is much radical thinking in this book wanting to come out, but the writers appear to be inhibited by a love affair with establishment science. This has the practical effect of treating lightly the voices of dissidents and playing down the influence funding providers are exerting within scientific and political circles. If Christians are to minister effectively to this situation, these are nettles that must be firmly grasped.

DAVID J. TYLER

This is an expansion of a review first appearing in Evangelicals Now.

›UNDERSTANDING THE PATTERN OF LIFE:

ORIGINS AND ORGANISATION OF THE SPECIES

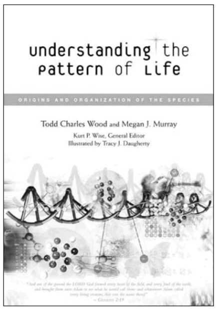
BY TODD CHARLES WOOD AND MEGAN MEGAN J. MURRAY. KURT P. WISE GENERAL EDITOR

BROADMAN & HOLMAN PUBLISHERS, NASHVILLE, TENNESSEE

DATE: 2003

ISBN: 080542714-7

BOOK REVIEW BY:
R. J. ALEXANDER


understanding the pattern of life
ORIGINS AND ORGANIZATION OF THE SPECIES
Todd Charles Wood and Megan J. Murray
Kurt P. Wise, General Editor
Illustrated by Tracy J. Daugherty

In science, it is easier to criticise the theories of others than to develop alternative theories. At the present time, criticism of Darwinism has reached unprecedented levels of sophistication and publicity, but scientific models providing an alternative basis for research are still in their infancy. This book takes up the challenge of developing a new approach to biosystematics, the grouping and naming of living organisms, from a young earth creationist perspective. The authors seek to explain scientific data in a way which is consistent, testable and fits with the Bible.

Biosystematics is a difficult area. Naming and classifying living organisms is basic to our understanding of the natural world around us, but at the present time there is no single universally accepted approach. This is well illustrated by "the species problem." Although the species is generally seen as the fundamental unit of mainstream biosystematics, its definition is still debated. There are more species concepts in popular usage today than at any point in the past century. This could be due to problems inherent in current theories but must also reflect the sheer complexity of the natural world.

Creation models suggest that the basic unit of biosystematics should be a more inclusive grouping than the species: the Genesis "kind". If the kinds are separated by detectable discontinuities, this could give an objective method of classifying of living organisms, perhaps lending creation models a significant head over competing evolutionary paradigms.

This book describes progress in a creationist approach to biosystematics known as baraminology, since its inception thirteen years ago. Dr Todd Wood, the principle author and an Assistant Professor at the Centre of Origins Research and Education at Bryan College, Tennessee, has contributed a great deal to the developments which are described. Of the three sections of the book, the first is theoretical, summarising the biblical, philosophical, historical and biological foundations of baraminology. The second section on methodology discusses their pros and cons of several types of evidence and gives many case studies. This section aims to equip the amateur scientist to carry out baraminological studies of his own. The final section applies baraminology to studies of design, biological imperfection, diversification and biogeography. Though conceptually difficult in places the book is clearly written and well illustrated.

The central feature of this book is a new definition of the baramin (created kind) called the 'refined baramin concept.' In the past, baramin have been defined phylogenetically (in terms of groups of organisms sharing common ancestors). However, the authors believe that the phylogenetic baramin concept demands unjustifiable inferences from both Biblical and scientific data. They argue that the Bible gives less information than has commonly been exegeted by creationists about created kinds. They also draw attention to the limitations of hybridisation experiments, the main experimental approach commonly used by creationists to infer common ancestry in living organisms.

The refined baramin concept drops phylogenetic inferences and depends instead on measurements of similarity between groups of organisms. Species are placed in different baramin if they show significant differences in a holistic range of morphological, molecular and ecological characteristics. This new definition seeks to avoid reading too much into the Bible and opens the way for a range of comparative methods to be used.

The major limitation of the refined baramin concept is that its implementation relies to some extent on subjective judgements by the baraminologist. Although the methods proposed allow description of variation, intuition is the principle way of knowing when the criteria of significance and holism are actually met by differences separating baramin. The authors document an idea which could help to solve this problem called potentiality regions in biological character space. This suggests that the gaps separating baramin exist because an intermediate between the baramin would have a combination of characteristics which could not make a viable organism. However, this is still a philosophical construct and has not yet given rise to practical methods.

Biosystematics is a fundamental scientific discipline affecting many areas of biology and the final section of the book applies baraminology to a wide range of issues. The authors discuss issues which have been seen as problems to creationists, such as the origins of pathogens, animal carnivory, and bacterial antibiotic resistance. They also seek to explain the biogeographic distribution of marsupials, the size of tortoises on the Galapagos Islands, and the emergence of sabre-tooth tigers. They advocate a theory of mediated design (God designed mechanisms to generate diversity in living organisms). The authors explain vestigial organs and junk DNA as cases of biological imperfection, but defend the inverted retina of vertebrates as a product of design. This section makes fascinating reading though few will agree with all they read.

The purpose of this book is to develop rather than defend creation science. The infallibility of scripture is presupposed throughout, and certain creationist models of geology and climate change are assumed at points. Weaknesses and mistakes in creation science are exposed and examined.

Because the authors aim to develop a theory which is not influenced by the naturalistic assumptions of mainstream science they develop a creationist terminology and emphasise their differences rather than their agreements with mainstream science. More frequent reference to mainstream science and explanations using conventional terms could have strengthened the authors' case in places and made the book more comprehensible to non-creationists. Baraminology is not yet a showpiece of the successes of creationism in empirical science, but it does show careful research underway and future success will owe a great deal to the authors of this book.

› NATURE VIA NURTURE

GENES, EXPERIENCE AND WHAT MAKES US HUMAN

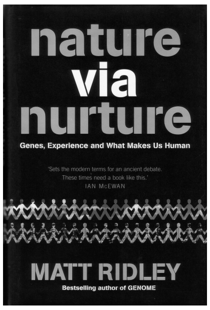
AUTHOR: MATT RIDLEY

PUBLISHER: FOURTH ESTATE, HARPERCOLLINS PUBLISHERS, LONDON

DATE: 2003

ISBN: 0 85115 745 7

BOOK REVIEW BY:
DAVID J. TYLER



Nature via Nurture. Genes, experience and Matt Ridley is a gifted science writer who specialises in exploring evolutionary themes. The trigger for *Nature via Nurture* was the media attention given to the Human Genome Project in 2000. Instead of the expected 100,000 genes, the researchers could only identify about 30,000. This leaves humans undistinguished in terms of our genetic library – we have parity with the mouse, less genes than a mustard weed and much less than a rice plant. Questions are being asked about what really makes us human.

Can it be our genes? Or, is our environment the secret of human behaviour? This "Nature versus Nurture" approach to these questions goes back to Francis Galton, who coined the phrase in 1874. Now, with only a third of the genes we were thought to have, and possibly only 500 genes distinguishing us from chimpanzees, people have concluded that the environment must be determinative in making us essentially human.

Ridley, who is known as a committed advocate of genetic influences, has put together a case for synthesising the polarised nature versus nurture debate. He champions an approach that seeks to integrate the apparently mutually exclusive positions. He describes genes as enablers, not constrainers. Environmental factors influence the way the genes function. As a consequence, genetic determinism can be replaced by a finite set of potentialities, with the particulars selected by the environment (nurture).

Nature via Nurture carefully interweaves many related stories using an anecdotal style. There are the key historical figures that have contributed to the nature/nurture debate. We meet Galton developing ideas about heredity, De Vries becoming the father of the gene, and Lorenz trail-blazing with his work on imprinting. On the nurture side, we have Watson's associations, Pavlov's reflexes and Freud's formative experiences. In all, we meet a dozen pioneers (all male) who founded the disciplines of ethology, neurobiology, anthropology and psychoanalysis. Alongside this, Ridley dips into contemporary research and recounts other incidents and findings to build his argument.

The title of the book is *Nature via Nurture*, not *Nurture via Nature*. Ridley seeks to prove to his readers that there is a robust genetic basis for behaviour. "The spooky truth is dawning on scientists that they can regard behaviour as an extreme form of development" and "development seems to be a rather well-determined process planned and plotted by genes". Although Ridley rejects traditional genetic determinism, he replaces it with a softer form where genes can be both cause and consequence of behaviour. "Nature does not prevail over nurture; they do not compete; they are not rivals; it is not nature versus nurture at all".

Modern-day research is interpreted as supporting this basic position. Although the findings are occasionally acknowledged to be tentative, they are often cited as fact. A spelling change in the DNA code can result in a different personality: "that it does so seems all but certain." In a study of criminality, Ridley concludes: "Genetic factors are predisposing the way people react to criminogenic environments."

It is significant that numerous much-publicised claims by genetic reductionists get little or no airing in this book. Over the years, headlines have repeatedly appeared announcing "genes for [being gay], [violent], [depressed], [intelligent], etc.". A study of the hype associated with these studies, and the subsequent back-tracking as to what the results actually mean, would make an interesting chapter. Unfortunately, it is not to be found in Ridley's book, as his critical comments are reserved for pioneers, not contemporary researchers. Furthermore, most of his case studies involve animal subjects, and the unquestioned assumption is that what applies to animals is likely to apply to humans.

If genes influence behaviour via nurture, then a probabilistic connection between the two is inevitable. This is one aspect of the book that I found both puzzling and frustrating. In a few cases, Ridley gives us the probabilities emerging from the research. However, in most cases, these figures are absent. Instead, we have words like "unusually", "more likely", and reassurances such as "it is reasonable to hypothesise". At best, Ridley has some correlations to discuss, but because the statistics are largely hidden, readers are left fumbling with concepts and feelings. The ability of this soft genetic determinism to predict the behaviour of any human being would appear to be very low. Is Ridley really any closer to answering the question "What makes us human?"

Both "genetic determinism" and "environmental determinism" are described as a "heartless creed". Elsewhere, Ridley refers to the idea of an inherited individual destiny as a "neo-Calvinist notion". Obviously liking the allusion, he later comments on "the bleak Calvinism of genes". Apart from revealing Ridley's theological education to be deficient, these comments make it clear that his book is opposed to all types of determinism. Basically, he says, if we are determined by nature or nurture, then we are not free.

To resolve the conundrum of freedom using the nature via nurture scheme, Ridley adopts an argument that considers causality to be circular. Free will "is the sum and product of circular influences with varying networks of neurons, immanent in a circular relationship between genes". There is no linear chain of causality, but a world in which thoughts and experiences feed off each other. The conclusion: "free will is entirely compatible with a brain exquisitely prespecified by, and run by, genes."

However, does Ridley's approach to freedom match up with our own perception that humans are free agents? Does "circular causality" really explain anything? The nature via nurture scenario still insists that we are the products of nature via nurture! Our responses to particular situations may be unique to our own mix of ingredients, but does that mean we escape being products of a deterministic smorgasbord? Ridley has another significant sentence showing that we still await a real explanation of free agency. "There is no 'me' inside my brain; there is only an ever-changing set of brain states, a distillation of history, emotion, instinct, experience and the influence of other people – not to mention chance." In other words, this person I call "me" is a slave of the past, the environment and chemistry. Release from bondage via circular causation is but an illusion.

Readers of *Nature via Nurture* quickly encounter Ridley's GOD: Genome Organising Device. Being a materialist, Ridley has no theistic implications for this word. Rather the GOD is introduced because the author has "an aversion to the passive voice". For stylistic reasons, he pretends "that there is a teleological engineer thinking ahead and planning purposefully". This GOD is actually a prominent figure in the book and, conveniently, it points the way for a different emphasis and different conclusions. Actually, it is difficult for materialists to be consistent because they are always making reference to design, fine-tuning, complex systems, purposeful activity and meaning. However, to move from contrived pretence to a full theism requires abandoning the central tenet of materialism: matter is all there is.

The question "What makes us human?" is a good one (Psalm 8:4). However, if we restrict the scope of our enquiry, as Ridley has done, the answers must remain obscure. Moving to a theistic science, we do not have to start with only the building blocks of "nature" and "nurture". We do not have to understand humankind as essentially physical. There is another dimension to our existence that is absolutely fundamental to self-knowledge. In one place, Ridley comments: "something can be partly true without being a complete answer." There are many partly true (and interesting) points in this book, but because its' GOD is a pretend engineer who works only at the level of nature, for the complete answer we need to look elsewhere.

This review first appeared in Evangelicals Now *and is reproduced here by permission.*

YOUR CORRESPONDENCE

› COMMENT ON THE ARTICLE:

TYPING MONKEYS PRODUCE A MESS.

DAVID J TYLER, ORIGINS 35
PAGE 16, NOV 2003

PAUL TAYLOR

Yes indeed! I have done a small calculation on the smallest sentence that I could think of “I love you”, which, while most meaningful in real life, is short and can be demonstrated to be impossible to generate meaningfully by random selection of keys.

PROBABILITY OF RANDOM SELECTION OF LETTERS PRODUCING THE INTELLIGENT MESSAGE “I LOVE YOU.”

The number of characters in the ‘message’ [Including spaces] = 10

If the characters are taken as the letters of the alphabet plus the space key, the probability of each character being chosen = 1/27 [1 divided by 27]

The probability of given sequence of ten characters being chosen = (1/27) multiplied by itself ten times or $(1/27)^{10}$ or one out of 205,891,132,094,649 possible combinations of letters.

To see what this means in practical terms, if the average number of letters per A4 page is taken as 4350 the amount of paper required to type all these possible combinations is 47,331,294,734 A4 pages. If a packet of 500 sheets measures 210 mm x 297 mm x 54 mm the volume of paper required would be 318,821.4 m_. The surface area of paper required would be 295,205 hectares and at 80g/ m2 the weight of paper required would be 236,164 tonnes.

The obvious conclusion to this is that, even if such a sequence of letters were produced, they would be buried under a mountain of paper containing meaningless letter sequences and would never be found.

This is for just the smallest sentence possible. For a sequence of letters comparable in size to a DNA sequence, such as ‘The Complete Works of Shakespeare’ the numbers are so astronomical as to be beyond human comprehension, far exceeding the number defined as ‘beyond possibility’ [taken as the number of particles in the whole universe multiplied by the number of seconds since the alleged ‘Big Bang’ 16 billion years ago].

Comment: Before the ‘message’ could have any meaning, there would have to be:

- One person who was self-aware and other-aware, who could utter the message.
- One other person similarly aware, who could receive the message.
- A common language between these two persons.
- A written form of the language in which the message could be encoded. [Characters representing sounds, which represent words, which represent ideas].
- A medium in which the code is embedded [paper and ink to contain the coded characters]
- A hand that can write the message using a suitable tool.
- An eye that can receive a visual reflection of the message.
- An optic nerve that can transmit an electrical signal to the brain.
- A visual centre in the brain that can interpret the nerve signals from the eye as written communication.
- A language centre in the brain that can interpret the letters as words and sentences.
- Etc.

Therefore no meaning could exist without intelligence that is supra-material i.e. not a property of material itself. The truth is that without an intelligent, personal Creator not one of these necessary conditions could exist.

Therefore the probability of this message occurring by random events only is not only vanishingly small, but in real-life the event is also entirely impossible without an intelligent author. The probability of the event happening randomly is in fact zero. This means that however often the trial is repeated, even to an infinite number of 'trials', the outcome remains certain never to occur.

As to the 'Works of Shakespeare' occurring solely by random selection of characters, the probability is so small that the universe itself, and its supposed age of billions of years are insufficient for there to be any hope of its occurring. To suppose that this kind of event is not only 'possible', but also constantly occurring at a high rate is ludicrous in the extreme.

The application of this to the information encoded in DNA is fairly direct, in my opinion, with substitutions for each element of the analogy but with similar numbers of layers of impossibility. e.g.

- DNA coding for an organism that has DNA molecules in its cell(s).
- DNA coding for proteins essential to life that are produced in the cell.
- DNA coding for the necessary 'helping' molecules in the copying process.
- DNA coding for the necessary cellular wall, that excludes some and allows in other molecules.
- DNA coding for the communication processes within the cell.
- DNA coding for the necessary transport system within the cell - materials in, products out.
- DNA coding for ... etc.

Meanwhile the DNA molecules themselves cannot exist without the pre-existing cell.

In spite of these layers upon layers of impossible things, Evolutionists have no trouble in imagining that even the development of the human brain, with its almost incomprehensible complexity, has arisen as the result of only random events over a few billion years! See for an example of such credulity:

http://www.bbc.co.uk/radio4/reith2003/reith2003_lecture1_transcript.shtml

PAUL G TAYLOR

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›LEAD ISOTOPE GEOCHEMISTRY

CORRESPONDANCE FROM
ANDREW A. SNELLING.

REPLY BY DAVID TYLER

David Tyler is to be congratulated for his informative article on “Dating the Earth and Accidents of Geochemistry” in *Origins* 35, pp. 8-10. However, there is far more to the “story” of lead isotopes. Furthermore, Hofmann’s comments are only his own views with which many other isotope geochemists would disagree. Thus Tyler’s article is incomplete and potentially misleading.

The Holmes-Houtermans model was indeed abandoned back in the 1970s, but was replaced by the Stacey-Kramers two-stage terrestrial lead isotope growth model in 1975. That model is still in use, because fortuitously it works! The age of the Earth (4.54 Ga), and the primitive lead starting point on terrestrial lead isotope growth curves, is determined by the meteorite lead isotope data that yield the so-called geochron, and the terrestrial lead isotope data fit the Holmes-Houtermans growth curve until 3.7 Ga. Stacey and Kramers then found that the younger data fitted on secondary growth curves emanating from that 3.7 Ga point, claiming some “geochemical differentiation” event at that time had changed the isotopic balance in the mantle reservoir from which the terrestrial lead has been extracted.

However, the overall picture is further complicated by the discovery in the last 40 years that modern and recent lavas on ocean islands have inherited their lead isotopes from their mantle sources and yield secondary isochron ages of 1-2 Ga. Furthermore, the lead isotopes in these volcanic rocks are more radiogenic than the geochron, which has puzzled geochemists and so has been called the lead paradox. Recently, a solution has been proposed, consistent with the now-recognized heterogeneity of source areas within the mantle having been generated by recycling of crustal rocks back into the mantle over time by the processes of plate tectonics. Thus the isotope ratios in these volcanic rocks, normally used to obtain radiometric dates, are the result of mixing and recycling during the Earth’s past history and subsequent inheritance.

Tyler has correctly, though briefly, referred to the problems with all the radiometric dating methods. Such problems are further exacerbated by the increasing recognition that just as the isotope ratios in modern and recent volcanic rocks are the result of recycling, mixing, and then inheritance from their magma sources, this is also true of ancient volcanic and intrusive rocks. However, all these problems aside, it has to be acknowledged that most radiometric dates systematically parallel the order of the strata in the geological record from oldest to youngest.

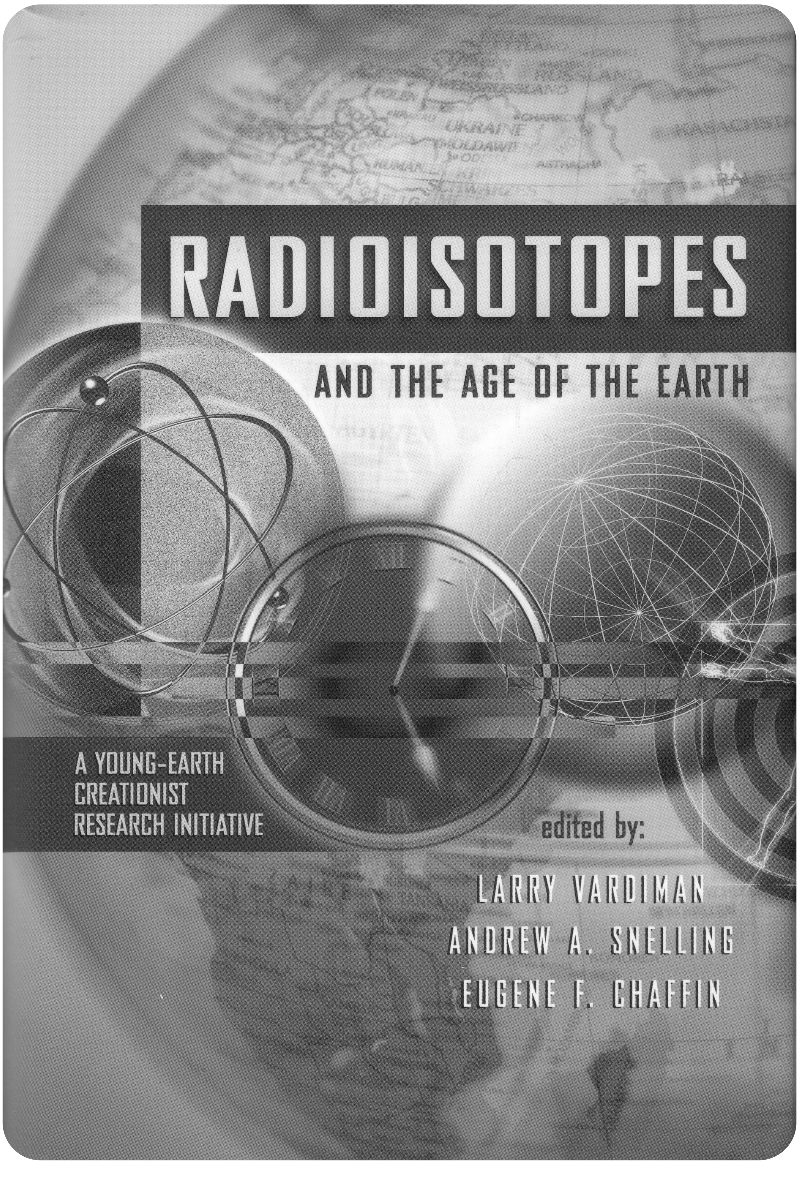
These are thus the patterns in the radioisotopic data that Tyler has recommended creationists should seek to explain in novel ways. However, Tyler unfortunately did not add that this is exactly what is being accomplished through the RATE (Radioisotopes and the Age of The Earth) research project, though that project was briefly mentioned on p. 15 of the same *Origins* 35. It has been proposed that the initial endowment of isotopes at creation was recycled and mixed, for example, during the Flood by catastrophic plate tectonics processes, while accelerated nuclear decay of radioisotopes was concurrently occurring to produce the systematic order of “dates” as the geological record accumulated.

Indeed, the issues referred to above have already been discussed in detail in a book produced by this project,[1] which includes these novel explanations that subsequent research has confirmed. Technical papers reporting those research results have now been published,[2] and a second book is to be published in 2005 as the project’s final report. *Origins* readers are strongly urged to read these books and papers for their edification and encouragement.

Sincerely, Andrew A. Snelling.

1. Radioisotopes and the Age of the Earth: a Young-Earth Creationist Research Initiative, L. Vardiman, A.A. Snelling and E.F. Chaffin (editors), Institute for Creation Research, El Cajon, CA and Creation Research Society, St Joseph, MO, 676 pp., 2000.

2. Proceedings of the Fifth International Conference on Creationism, 2003. See: http:///www.icr.org/research/. Genesis Agendum Occasional Paper 8, 2003. (A.A. Snelling, “Radioactive dating: research confirming the Biblical record”.)



REPLY FROM DAVID TYLER

I thank Andrew Snelling for this feedback. I willingly acknowledge that my article was incomplete:

it was a reflective commentary on a paper by Hoffman and it did not attempt to be a systematic analysis of lead-lead dating techniques. Does this make it potentially misleading? I do not think the article leads people in the wrong direction.

Hoffman’s paper certainly has “only his own views”, but it was presented at a conference addressing age-dating issues, constructively reviewed by several international figures, refereed and included in the Conference Proceedings. This gives it considerably more authority than many other contributions on this theme.

Is it significant that I did not mention the RATE project? “Tyler unfortunately did not add that this is exactly what is being accomplished through the RATE (Radioisotopes and the Age of The Earth) research project).” The main reason for not mentioning the RATE project is that my short contribution is based on Hoffman’s work. A secondary reason is that the RATE project is very committed to short bursts of accelerated radiometric decay in the past, and I did not want to write about the good work being done without expressing reservations about the explanatory framework emerging from this project. In a short article, authors have to maintain a focus.

However, I am happy to recommend readers to a major contribution on these matters by Andrew Snelling. This is Chapter 5: “Geochemical processes in the mantle and crust” (pages 123-304, Radioisotopes and the Age of The Earth, Vardimann, L., Snelling, A.A. and Chaffin, E.F. 2000, ICR, California.) Hoffman’s paper was published after this chapter was written and, in my view, enhances the analysis presented in Andrew’s Chapter 5.

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The price of a single issue is £3.00 plus postage. *Origins* 27 was a special issue with a price of £3.50 plus postage.

Credits and Acknowledgments

ISSN 0953-2773

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Illustrations of the fossil baleen whales were kindly supplied by Art Chadwick.

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Design by fourninezero design (4-9-0 ltd).
http://www.fourninezerodesign.co.uk

Printed by W&G Baird, Nottingham.

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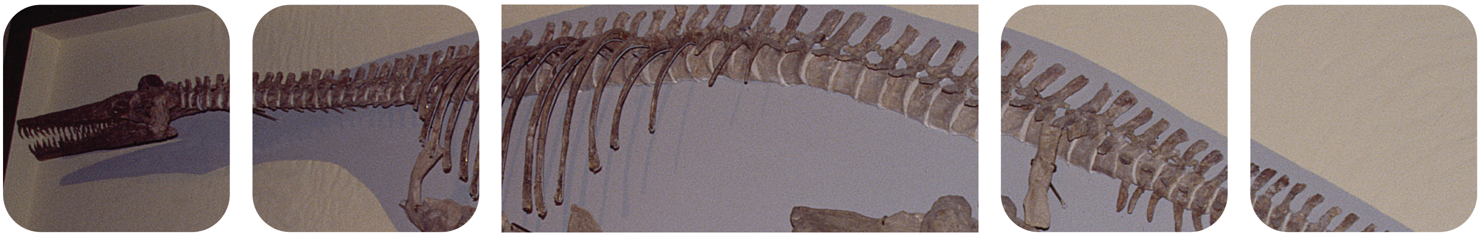

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